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10/030,285	05/13/2002	Hartmut Rudolf Fischer	310.1024	9029

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EXAMINER
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WYROZEBSKI LEE, KATARZYNA I

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/030,285

Applicant(s)

FISCHER ET AL.

Examiner

Katarzyna Wyrozewski Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-15 and 17-19 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0502. 6) ☐ Other:

### DETAILED ACTION

The examiner would like to point out that the recitation "for coating" in claim 1 of the present invention is considered an intended use. In view of preliminary amendment the examiner acknowledges cancellation of claim 16. Claims 1-15 and 17-19 are pending.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 12, it is not clear how organic-inorganic hybrid material is a polymer. The extent of the term "organic" and "inorganic" encompasses wide range of compounds not satisfactorily discussed in the specification. If anything organic-inorganic hybrid materials are composites.

*Claim Objections*

3. Claim 14 is objected to because of the following informalities: In the instant case, claim 14 is composition claim that depends on process claim. Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-6, 11, 12, 14, 15, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by OSWALS (US 4,136,103).

The prior art of OSWALD discloses clay intercalated with cationic compound. The compound of the prior art of OSWALD is di- or polyphosphonium salt (col. 4, lines 27-31 and 68), where R6 separating the two phosphonium cations is alkyl having preferably 1-14 carbon atoms (col. 5, line2-4).

The clay component of the prior art of OSWALD is selected from smectite type clay such as montmorillonite and layered double hydroxide clays such as kaolinite (col. 9, lines 3-14).

In the process of OSWALD the clay component is formed in polar media, which is mixture of water and isopropanol (example col. 12).

The clay dispersion is utilized with polymers, such as polystyrene (example, col. 28), which is polymerized *in situ*.

In the light of the above disclosure, the prior art of OSWALD anticipates requirements of claims rejected above.

6. Claims 1-4, 9, 11, 12, 14, 15, 17-19 are rejected under 35 U.S.C. 102(e) as being anticipated by LAN (US 6,262,162).

The prior art of LAN discloses clay intercalated with multi-charged onium compound, wherein composition can be utilized as coating (col. 22, line 3).

Cation exchange capacity of the smectite clay of LAN is 0.15-0.9 miliequivalents per gram (col. 14, lines 21-24) or 15-90 meq/100 g. Clays that can be utilized include smectite clay

such as montmorillonite, hectorite, saponite as well as layered micas, illites and mixtures of clays.

In the process of LAN, the clay is dispersed in aqueous solution that may contain water miscible solvents such as propanol (col. 14, lines 45-60) then it is intercalated with onium compound.

According to the prior art of LAN, the two ionic species of the intercalating agent are separated by alkyl, aralkyl or substituted alkylene having 2-24 carbon atoms and preferably 3-10 carbon atoms (col. 12, lines 10-16).

The intercalated clay is then incorporated into polymer such as polyamide, PMMA (example 7-9), polyesters (col. 19, lines 6-55) as well as polyurethane, polycarbonate, polyolefins, elastomers and rubbers, polyethers, polyepoxides, polyketones and the like (col. 17-18).

In the light of the above disclosure, the prior art of LAN anticipates requirements of claims rejected above.

7. Claims 1-6, 9, 11, 12, 14, 15, 18 are rejected under 35 U.S.C. 102(e) as being anticipated by CLAUDBERG (US 6,610,722).

The prior art of CLAUDBERG discloses composition where clay is intercalated with compound having formula as depicted in top of col. 7, lines 1-50. The intercalating compound can have two positively charged atoms that can be either nitrogen or phosphorus. The two cations are separated by R2, that is oligomeric compound such as polyolefins. The fact that they are oligomeric means that they will have more than 4 carbon atoms.

The intercalated clay has cation exchange capacity of 0.3-3.0 meq/g or 30-300 meq/100g (col. 4, line 45). Clay components include natural and synthetic clays such as montmorillonite, magadiite, kenyaite, beidelite, mica and the like (col. 4, lines 59-64), wherein magadiite and kenyaite are representative of layered double hydroxides.

Intercalate is made by dispersing clay in aqueous solution with cationic compound so that most of the clay cations are exchanged. The clay is then filtered and incorporated into polymeric component such as polyamides, polyesters, polyolefins (col. 9, lines 41-51), polystyrene, polyacrylates and the like.

In the light of the above disclosure, the prior art of CLAUDBERG anticipates claims rejected above.

### *Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 5, 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over LAN (US 6,262,162) in view of OSWALD (US 4,136,103).

The discussion of the disclosure of the prior art of LAN from paragraph 6 of this office action is incorporated here by reference.

The difference between the present invention and the disclosure of the prior art of LAN is showing that the layered component can also be layered double hydroxide as well as presence of initiator.

The discussion of the disclosure of the prior art of OSWALD from paragraph 5 of this office action is incorporated here by reference.



In addition, the fact that the prior art of OSWALD polymerizes polystyrene *in situ* in presence of clay components indicates that initiator is added. There are only two choices of addition of initiator. One is to the styrene dispersion and the other to the clay dispersion.

Layered double hydroxides such as those of OSWALD can be treated in the similar manner as the layered silicates. Both contain exchangeable ions, which can be exchanged for an organic compound and thereby result in ion exchange. Also, addition of initiator to the clay dispersion would avoid premature polymerization of styrene.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize clays of OSWALD in the composition of LAN and thereby obtain the claimed invention. Use of the clays of OSWALD would also result in intercalation of the organic compounds between clay platelets. In addition, use of monomer and then subsequent polymerization of it *in situ* would also provide swelling of the clay platelets.

12. Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over LAN (US 6,262,162) in view of BARBEE (US 6,486,254).

The discussion of the disclosure of the prior art of LAN from paragraph 6 of this office action is incorporated here by reference.

The difference between the present invention and the disclosure of the prior art of LAN is recitation of an organic dye as clay modifier.

With respect to the above difference, the prior art of BARBEE discloses composition comprising intercalated clay, wherein clay can be layered double hydroxide (col. 6, lines 58-67).

The clay is intercalated with coloring agents that contain ammonium functionality on one end that is linked to chromophore by linking group such as oxygen, sulfur or sulfate. The chromophores of the prior art of BARBEE are neutral in nature and include anthraquinones, methines, naphthalene, phthalocyanides and the like (col. 5, lines 30-67).

The prior art of BARBEE discloses that the colorant compounds can also equally well intercalate in between the clay platelets, as they also contain ammonium functionality.

With respect to the above difference, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize intercalants of BARBEE in the composition of LAN and thereby obtain the claimed invention. Use of the intercalants of BARBEE is also expected to undergo ion exchange with clay and thereby intercalate in-between the clay platelets.

*Allowable Subject Matter*

13. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 7 and 8 of the present invention require that at least one of the ionic group of the modifier be anionic. The prior art of record does not teach that. Although it is well known that compounds such as hydrotalcites can undergo anionic exchange with the organic compound,

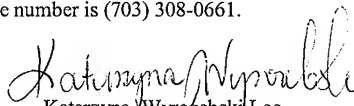
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none of the prior art considered disclosed use of organic compound that would have at least two ionic moieties at least one of which is anionic.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski Lee whose telephone number is (571) 272-1127. The examiner can normally be reached on Mon-Thurs 6:30 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Katarzyna Wyrozebski Lee  
Primary Examiner  
Art Unit 1714

January 2, 2004